CLAIMS

What is claimed is:

1. A method of forming an ink-jettable composition comprising:

(a) providing a viscous printing composition characterized in that has a Brookfield viscosity in excess of 100 cps at 25° C and is suitable for application to a substrate using an impact printing technique; and

(b) adding to said viscous printing composition a diluent under conditions and in an amount effective to produce an ink-jettable composition, said diluent comprising:

(i) at least one surface tension modifier;

(ii) optionally a solvent.

2. The method of claim 1 wherein said viscous printing composition is a hydrophilic viscous printing composition.

3. The method of claim 2 wherein said diluent surface tension modifier is selected from the group consisting of water soluble and water miscible glycol derivatives, water soluble and water miscible organic solvents having substantially similar surface active properties to said glycol derivatives, and mixtures of any two or more.

4. The method of claim 3 wherein said diluent further comprises at least one glycol and water.

5. The method of claim 4 wherein said diluent further comprises sodium hydroxide.

6. The method of claim 3 wherein said surface tension modifier is selected from the group consisting of N-alkyl heterocyclic amines, mono-, di-, and tri- propylene glycol n-butyl ether, mono-, di-, and tripropylene glycol n-propyl ether, mono- and diethylene glycol n-butyl ether, propylene glycol methyl ether acetate, and polypropylene glycol alkyl-ethers where the alkyl group has from about 1 to about 6 carbon atoms and is linear, branched, or cyclic, wherein said surface tension modifiers are further characterized by being water soluble or water miscible.

7. An ink-jettable composition produced in accordance with claim 1.

8. The ink-jettable composition of claim 7 wherein said surface tension modifier comprises propylene glycol phenyl ether.

9. The method of claim 1 wherein said surface tension modifier is selected from the group consisting of glycol derivatives, esters of difunctional fatty acids, and mixtures of any two or more, wherein said surface tension modifier is further characterized by being partially or completely miscible with said viscous printing

composition.

10. A composition produced by blending with a hydrophilic viscous printing composition suitable for application to a substrate utilizing an impact printing technique, a diluent comprising:

    i. water;

    ii. at least one glycol;

    iii. one or more surface tension modifier;

    iv. optionally, ammonium hydroxide; and

    v. optionally one or more hydrophilic solvent.

    the composition being further characterized in that it is suitable for application to a substrate utilizing an ink-jet printing device.

11. The composition of claim 10 comprising from about 10 to about 40 wt. % of a water-based screen printing paste, about 5 to about 20 wt. % water, about 0.5 to about 1 wt. % ammonium hydroxide, about 10 to about 40 wt. % of at least one glycol compound and about 20 to about 50 wt. % of at least one surface tension modifier.

12. The composition of claim 10 wherein said hydrophilic viscous printing composition is a textile printing paste.

13. The composition of claim 10 comprising:

(a) from about 1 wt. % to about 15 wt. % of a water-based screen printing paste;

(b) from about 60 wt.% to about 70 wt. % water;

(c) from about 5 wt.% to about 20 wt. % of at least one glycol;

(d) from about 5 wt.% to about 20 wt. % of one or more surface tension modifier;

(e) up to about 10 wt. % of glycerol; and

(f) up to about 5 wt.% of a binder,

wherein the composition is further characterized in being jettable from an ink-jet printing device.

14. The composition of claim 13 wherein said glycol is propylene glycol and said surface tension modifier is N-methyl pyrrolidine.

15. The composition of claim 13 wherein the composition is further characterized by having a viscosity of from about 3 cps to about 5 cps at ambient temperature and a surface tension of from about 35 to about 40 dynes/cm

16. The composition of claim 10 wherein said surface tension modifier is a member of the group consisting of mono-, di-, and tripropylene glycol methyl ether, mono-, di-, and tri-propylene glycol n-butyl ether, mono-, di-, and tripropylene glycol n-

propyl ether, mono- and diethylene glycol n-butyl ether, polypropylene glycol alkyl-ethers, propylene glycol methyl ether acetate, and blends of any two or more, the glycol-derivatives being further characterized in that they are miscible with both water and said glycol.

17. The composition of claim 10 wherein said glycol compound is selected from mono-, di-, tri-, and tetra ethylene glycol and mono-, di-, and tripropylene glycol and mixtures thereof.

18. The composition of claim 10 wherein said diluent comprises: (a) from about 0.5 wt.% to about 1 wt.% of ammonium hydroxide present as an aqueous ammonium hydroxide solution; and (b) as a surface tension modifier about 43 wt.% of tripropylene glycol methyl ether.

19. The composition of claim 7 wherein the composition is further characterized as having a viscosity as measured with a Brookfield viscometer of less than about 100 cps at 25°C.

20. The composition of claim 7 wherein the composition is further characterized as having a viscosity, as measured by a Brookfield viscometer, of less than or equal to about 13 cps at some temperature from about 30 °C to about 40 °C.

21. The composition of claim 19 having a having a viscosity as measured with a Brookfield viscometer of from about 5 to about 20 cps at an operating temperature of an ink-jet printing device.

22. The composition of claim 21 which is further characterized by having a surface tension as measured by the platinum ring technique of less than or equal to about 72 dynes/cm.

23. The composition of claim 21 having a viscosity of from about 1 to about 5 cps at an operating temperature of an inkjet printing device selected from the group consisting of a continuous-type ink-jet printing device and a thermal-type ink-jet printing device.

24. The composition of claim 21 having a viscosity of from about 5 to about 20 cps at an operating temperature of an impulse-type ink-jet printing device.

25. The composition of claim 24 which is further characterized by having a surface tension as measured by the platinum ring method of between about 25 dynes/cm and about 50 dynes/cm.

26. The composition of claim 23 which is further characterized by having a surface tension as measured by the platinum ring method of less than or equal to about 65

dynes/cm.

27. The composition of claim 25 which is further characterized by having a surface tension as measured by the platinum ring method of between about 30 dynes/cm and about 40 dynes/cm.

28. The composition of claim 19 wherein said surface tension modifier is tripropylene glycol methylene ether.

29. The composition of claim 10 wherein said glycol compound is propylene glycol.

30. The composition of claim 7 wherein said hydrophilic viscous printing medium comprises about 30 wt. % of the composition and said diluent comprises about 70 wt. % of the composition.

31. The composition of claim 10 wherein said diluent comprises:

(a) about 1 wt.% ammonium hydroxide;

(b) about 20 wt. % water;

(c) about 7 wt. % glycerine;

(d) about 29 wt% propylene glycol; and

(e) about 43 wt. % tripropylene glycol methyl ether.

32. A composition of claim 7 produced by blending with a lipophilic viscous printing composition suitable for application to a substrate utilizing an impact printing technique, a diluent comprising: (a) a member selected from the group consisting of a surface tension modifier and a fatty acid ester; and optionally (b) a solvent, the composition being further characterized in that it is suitable for application to a substrate utilizing an impulse-type ink-jet printing device.

33. The composition of claim 31 comprising: (a) from about 10 to about 40 wt. % of a lipophilic viscous printing composition; (b) about 10 wt. % to about 50 wt. % of a solvent selected from the group consisting of fatty acid oil-soluble esters and amines; and (c) about 20 to about 70 wt. % of at least one surface tension modifier.

34. The composition of claim 31 comprising: (a) from about 10 to about 40 wt. % of a lipophilic viscous printing composition; (b) about 10 wt. % to about 50 wt. % of a solvent selected from the group consisting of fatty acid oil-soluble esters and amines; and (c) about 20 to about 70 wt. % of at least one fatty acid ester.

35. The composition of claim 34 wherein said fatty acid ester is dibutyl sebacate.

36. The composition of claim 31 wherein said lipophilic viscous printing composition is an oil-based screen printing paste.

37. The composition of claim 31 wherein said surface tension modifier is a member of the group consisting of mono-, di-, and tripropylene glycol methyl ether, mono-, di-, and tri-propylene glycol n-butyl ether, mono-, di-, and tripropylene glycol n-propyl ether, mono- and diethylene glycol n-butyl ether, polypropylene glycol alkyl-ethers, propylene glycol methyl ether acetate, and blends of any two or more, the glycol-derivatives or blends thereof being further characterized in that they are miscible with said lipophilic viscous printing composition.

38. A process for adapting a viscous printing composition which is suitable for application to a substrate utilizing an impact printing technique to a form in which it is suitable for application to a substrate utilizing an ink-jet printing device, the process comprising:

(a) providing an aliquot of a viscous printing composition suitable for application by an impact printing technique from the group consisting of a hydrophilic viscous printing composition and a lipophilic viscous printing composition;

(b) blending said viscous printing composition with a diluent, said diluent being further characterized in that it is miscible with said viscous printing composition and disperses said viscous printing composition, the blend being characterized in that it has a viscosity as measured by a Brookfield viscometer of less than about 100 cps at 25°C and a surface

tension of less than about 65 dynes/cm when measured by the platinum ring technique; and

(c) filtering said blend to remove particles greater than about 1 micron,

the blend being further characterized in that it will wet the internal components of an ink-jet printing device and has a physical form suitable, at an operating temperature of an ink-jet printing device, for application to a substrate utilizing an ink-jet printing device.

39. The process of claim 38 wherein said step (b) blend has a viscosity of from about 5 cps to about 20 cps at an operating temperature of an impulse-type ink-jet printing device and a surface tension of from about 25 dynes/cm to about 45 dynes/cm.

40. The process of claim 38 wherein said step (b) blend of said diluent and viscous printing composition has a viscosity of from about 1 cps to about 5 cps at an operating temperature of an ink-jet device selected from the group consisting of a thermal-type ink-jet printing device and a continuous-type ink-jet printing device.

41. The process claim 38 wherein said viscous printing composition is a water-based textile printing paste.

42. The process of claim 38 wherein the diluent comprises the diluent of claim 10.

43. The process of claim 38 wherein said viscous printing composition comprises:

(a) from about 26 wt % to about 88 wt. % water;

(a) from about 7 wt. % to about 50 wt. % of at least one pigment;

(b) up to about 23 wt. % diethylene glycol;

(c) up to about 13 wt. % of one or more resins; and

(d) up to about 5 wt. % an amino alcohol.

44. A process for applying to a substrate utilizing an ink jet printing device a viscous printing composition characterized in that it is initially in a form suitable for application to a substrate utilizing an impact printing technique, the process comprising:

a. adapting the form of said viscous printing composition by blending with a diluent of claim 1, said adapted printing composition being further characterized in that it is jettable from an ink-jet printing device; and

b. applying the adapted printing composition to a substrate with an ink-jet printing device.

45. The process of printing a substrate comprising applying to a substrate with an ink-jet printing device the composition of claim 7.

46. The process of claim 43 wherein said viscous printing composition is a screen printing paste suitable for printing textiles and said substrate is a textile substrate.

47. A method for printing utilizing an ink jet printing device comprising:

(i) providing a viscous printing composition having a viscosity as measured using a Brookfield viscometer in excess of about 100 cps at 25 °C and a surface tension in excess of about 72 dynes/cm;

(ii) storing said viscous printing composition under conditions suitable to permit a portion of said stored printing composition to be applied to a substrate utilizing an impact printing technique;

(iii) subsequent to step (ii), blending with a portion of said viscous printing composition a diluent of a type and in an amount that provides a composition having suitable viscosity at an operating temperature of an ink-jet printing device and suitable surface tension to permit application of the admixture to a substrate utilizing an ink-jet printing device; and

(iv) removing particles larger than about 1 micron from said blend.

48. The method of claim 47 wherein said viscous printing composition comprises a screen printing paste.

49. The method of claim 47 wherein said viscous printing composition is a hydrophilic viscous printing composition and said diluent comprises:

i. an aqueous ammonium hydroxide solution;

ii. glycerine;

iii. at least one glycol compound;

iv. at least one surface tension modifier; and

v. optionally, one or more alkyl alcohol.

50. The method claim 47 wherein said ink-jet printing device is selected from the group consisting of a thermal ink-jet printing device, a continuous ink-jet printing device and an impulse-type ink-jet printing device.

51. The method of claim 47 wherein said viscous printing composition is a water-based screen printing paste suitable for printing on a textile substrate.